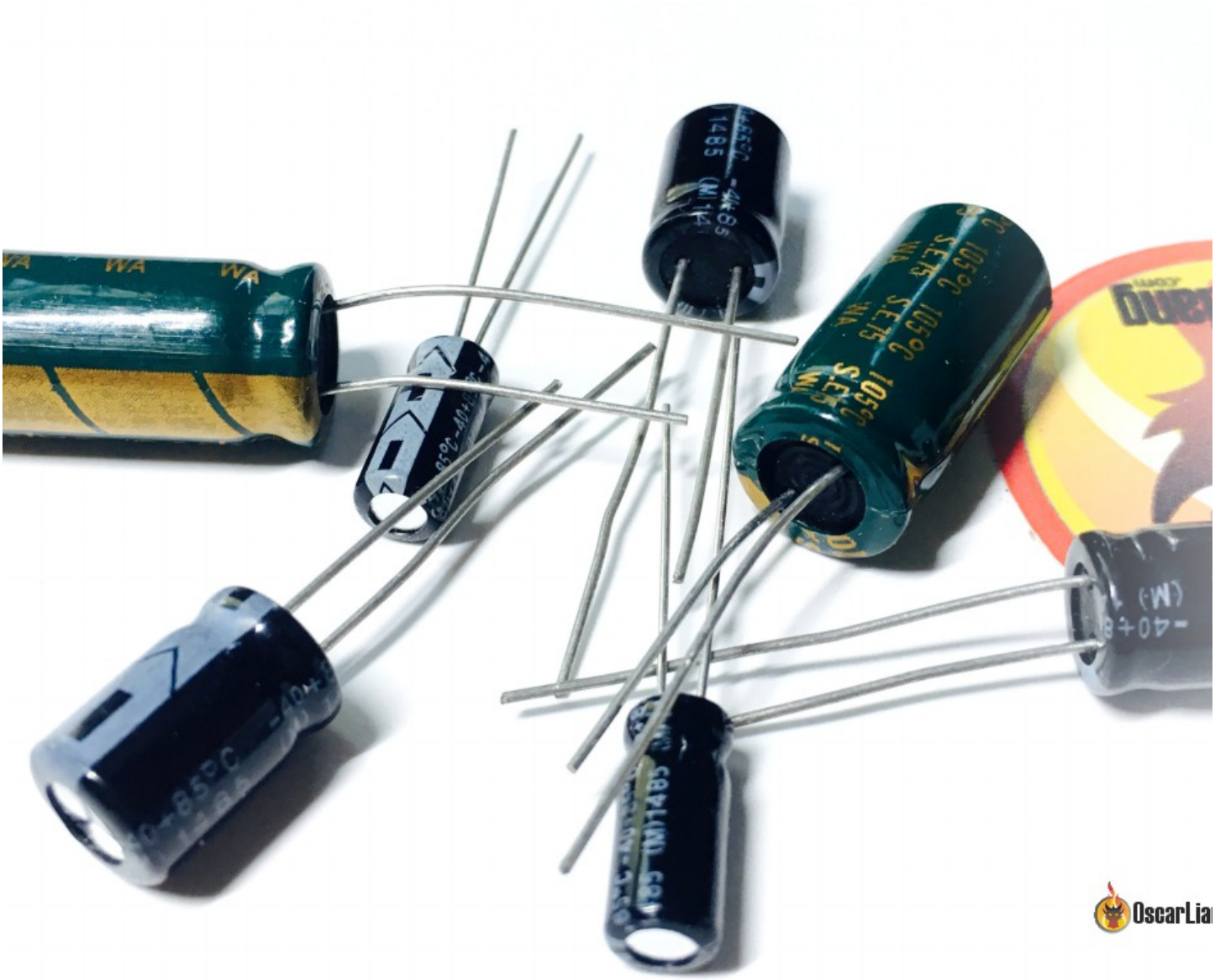
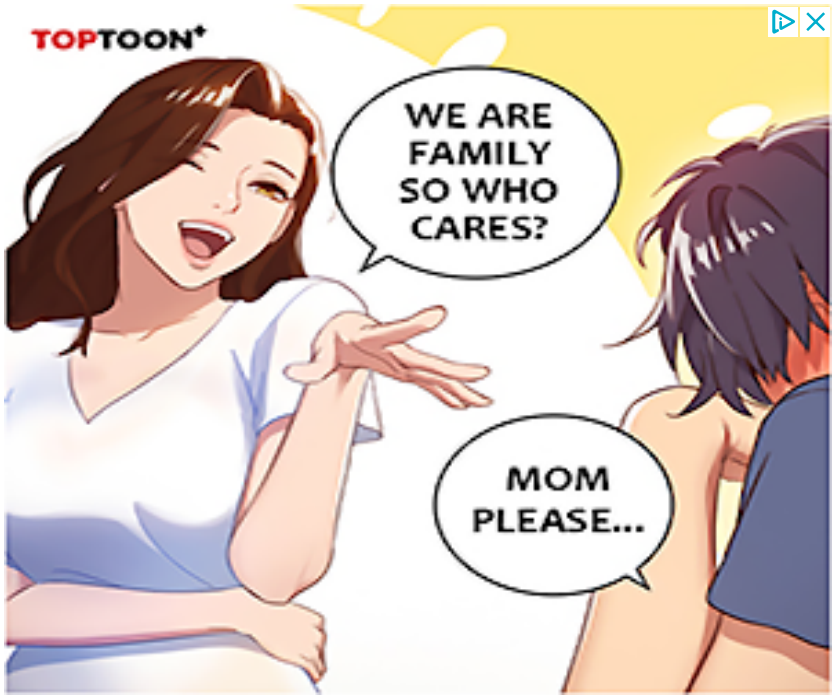
Capacitors For Noise Filtering in Mini Quad

Published: 1st January 2020 | **Last Updated on** 16th April 2021





Where to Buy Capacitors?

I recommend Panasonic FM as it shows the lowest ESR in the testing.

Large Caps (to solder to XT60 pads)

- 1000uF – Amazon | GetFPV
- 640uF – GetFPV

Small Caps (to solder to ESC power pads on 5″, or use on smaller builds power pads)

- 470uF – Amazon | GetFPV

- 3S: 16V or higher
- 4S: 25V or higher
- 5S: 35V or higher
- 6S: 35V or higher (50V is safer)

The above suggestions are mainly for 5″, 6″ and 7″ builds, for smaller builds, you could use smaller ca the power of these builds is lower. For example, on 2″ you could solder 220uF to the power pads, whil 470uF might be enough. You don't have to follow this to the letter, you can probably get away with sma caps, it all depends on how noisy and powerful your build is.

What Causes 'Noise' in Mini Quad?

Noise is caused by quickly varying voltages, current and frequencies in an electrical circuit, even a mo running smoothly can cause these fluctuations.

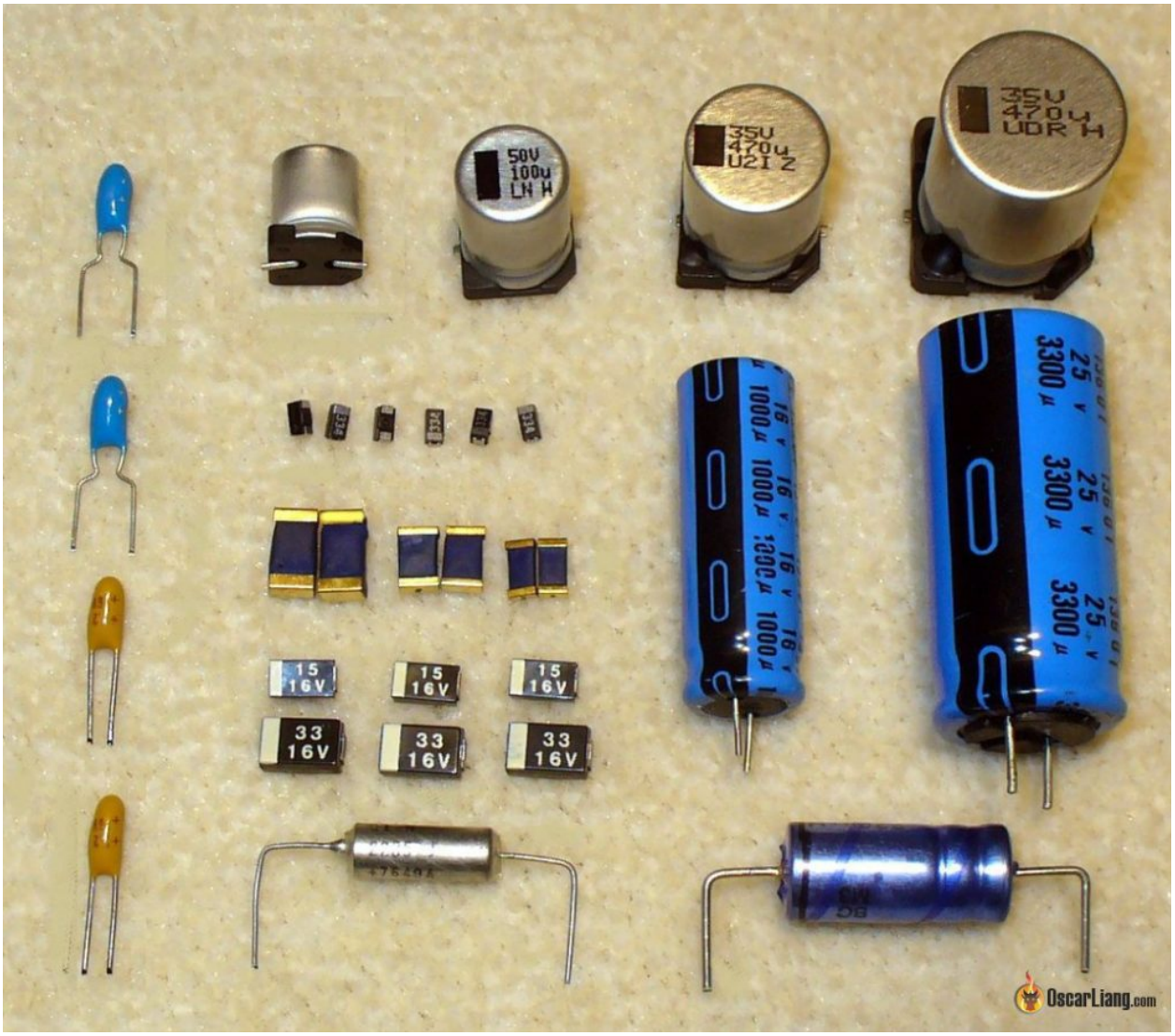
When you think of the changing conditions all the motors on a multirotor experience, you realize that th electrical environment of a mini quad can be described as downright hostile. Your FC, VTX , camera a peripherals all need stable electrical conditions to run optimally, which places them firmly in enemy airs literally surrounded by bogies!

As technology advances allowing for more powerful motors and ESC's, the problem becomes even mo pronounced.

The noise issue is absolutely crucial, it can mean the difference between a fantastic FPV mini quad an something that is completely unflyable.

What are Low ESR Capacitors?

There are many forms of capacitors and they are one of the most components in electronics.



The main use of capacitor in FPV is for filtering out ripples and noise in the power supply. It acts like a battery, when there are voltage spikes, it absorbs it like charging a battery; when there is voltage drop, discharged by releasing the energy. Overall the voltage level is more smooth.

Adding more capacitors can help clean up our power a great deal, which gives you the following benef

- Reduced video noise in your FPV feed
- A reduction in noise that can corrupt motor, ESC and radio signals
- proved flight characteristics and performance, by “cleaning up” the noise in the power to the G

We prefer **low ESR capacitors** for our purposes. ESR stands for "**Equivalent Series Resistance**". Capacitors with lower ESR show better filtering capability as demonstrated in this video.

LC filters are often used in FPV systems to combat video noise as well, but it only protects the system the noise is induced. Adding capacitor at the source of the power on the other hand, protects the entire system by preventing the noise from being induced in the first place.

Here is an example showing how much improvement it made to my FPV video feed after installing a c at the XT60 power input.

Does my mini quad need capacitors?

You don't have to use caps, but we recommend it. As mum says:

> *"Put a cap on, it's noisy out there!"*

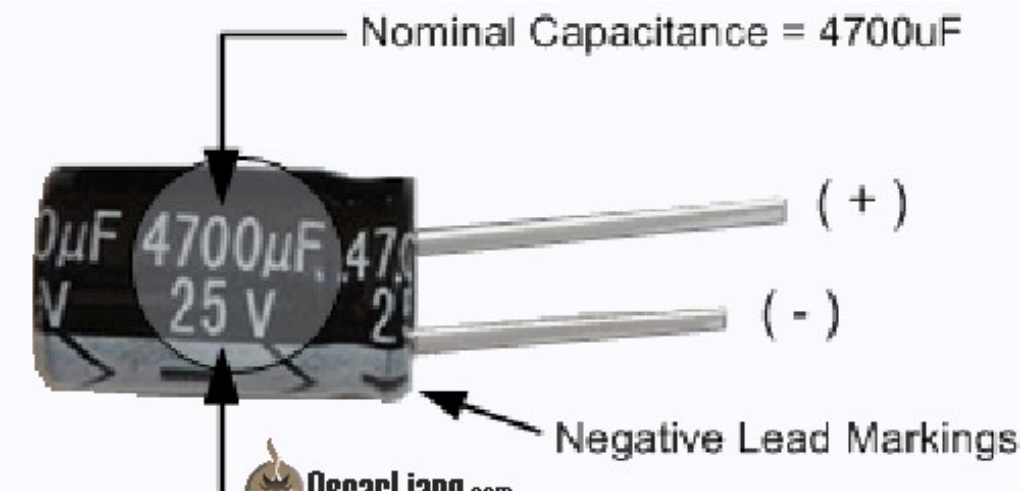
If you have a noisy quad (lots of oscillations and hard to tune PID), or noisy video feed, adding capacit would probably be the first thing to try.

Here is how you can decide whether your quad is too noisy and need cap.

- Listen to the motors and see if there are oscillation that you can't tune out with PID
- Check for hot motors
- Noise in your video feed is another sign of electrical noise in the power
- In extreme cases, you can get ESC/motor desync and "death of roll" and cause you to crash to th ground. Noise can corrupt your ESC signals

Even if you don't have a noisy build, it's still good practice to add caps. Better safe than sorry right? :) and misshapen props can introduce noise in your power, the adding caps might actually help with that

re to Install Capacitors in a Mini Quad?

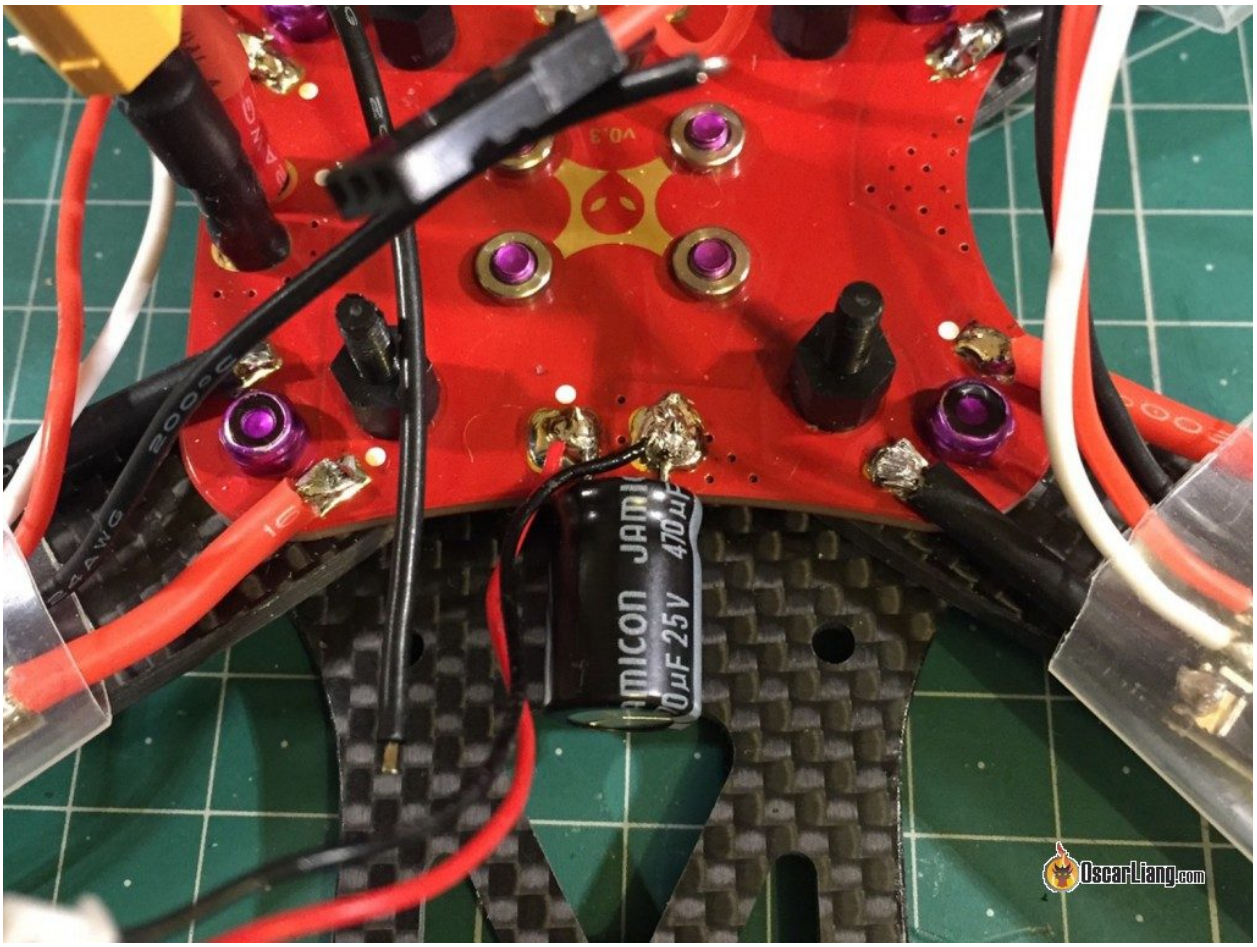


How to Read Capacitor Spec

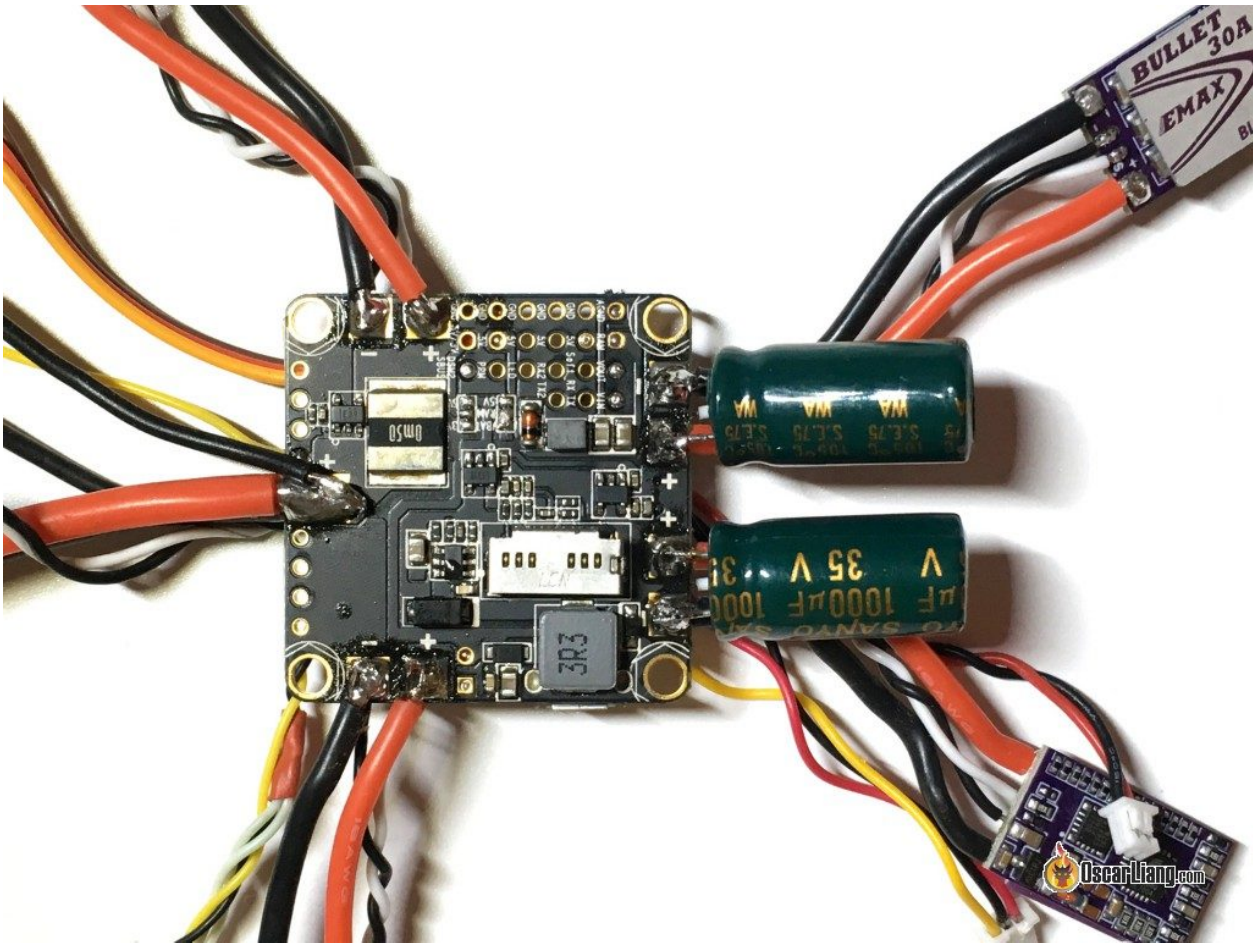
Solder the capacitor to either the ESC power or XT60 solder pads. Negative to negative, positive to pc
Make sure you secure the capacitor with ziptie, double-sided foam tape, or glue after soldering.

There are 3 places where you can add your capacitors for them to be effective. Be aware that you onl
to install caps in **one of these locations**.

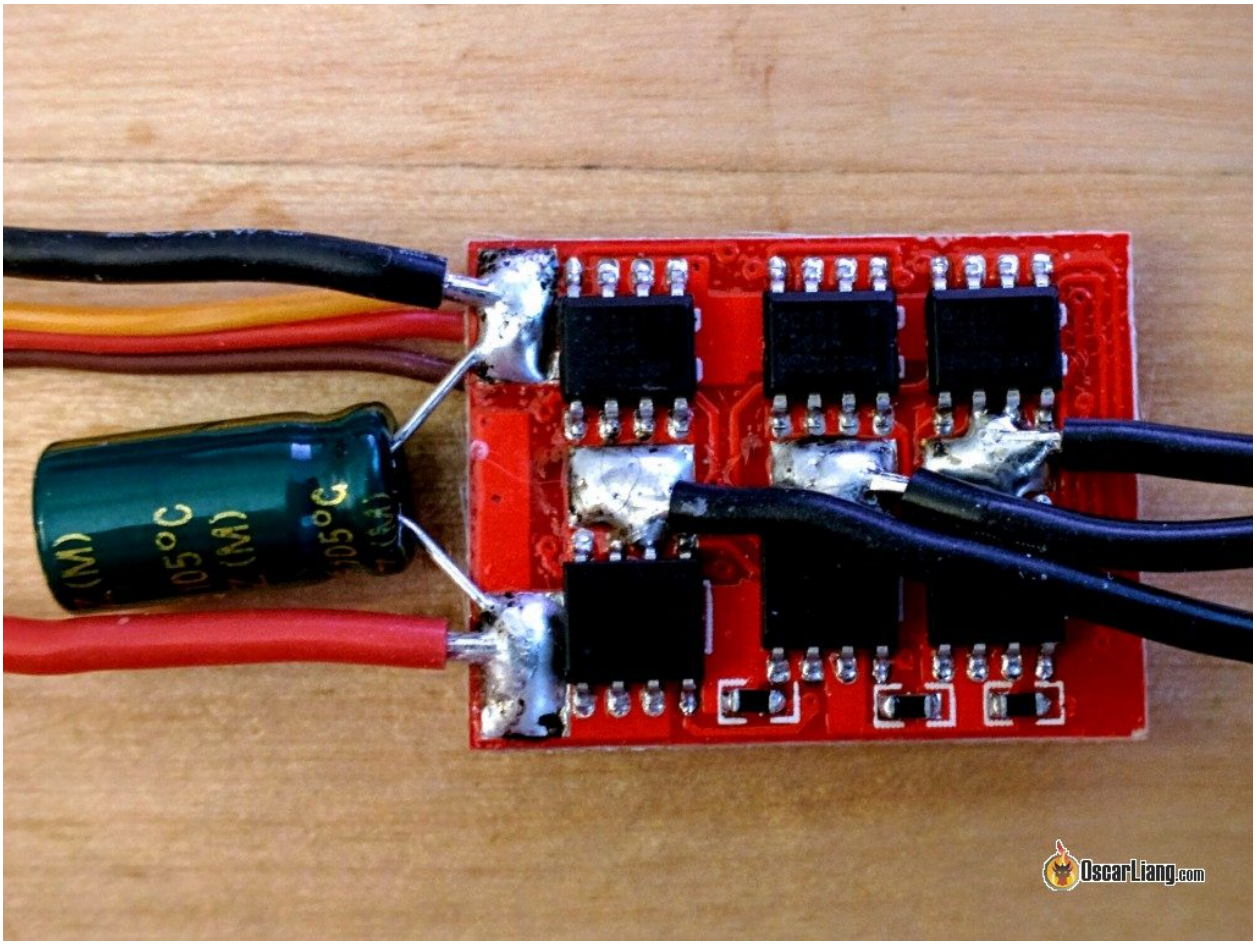
1. On the PDB, where XT60 pigtail is soldered.



2.Where the ESC power leads are soldered to the PDB.



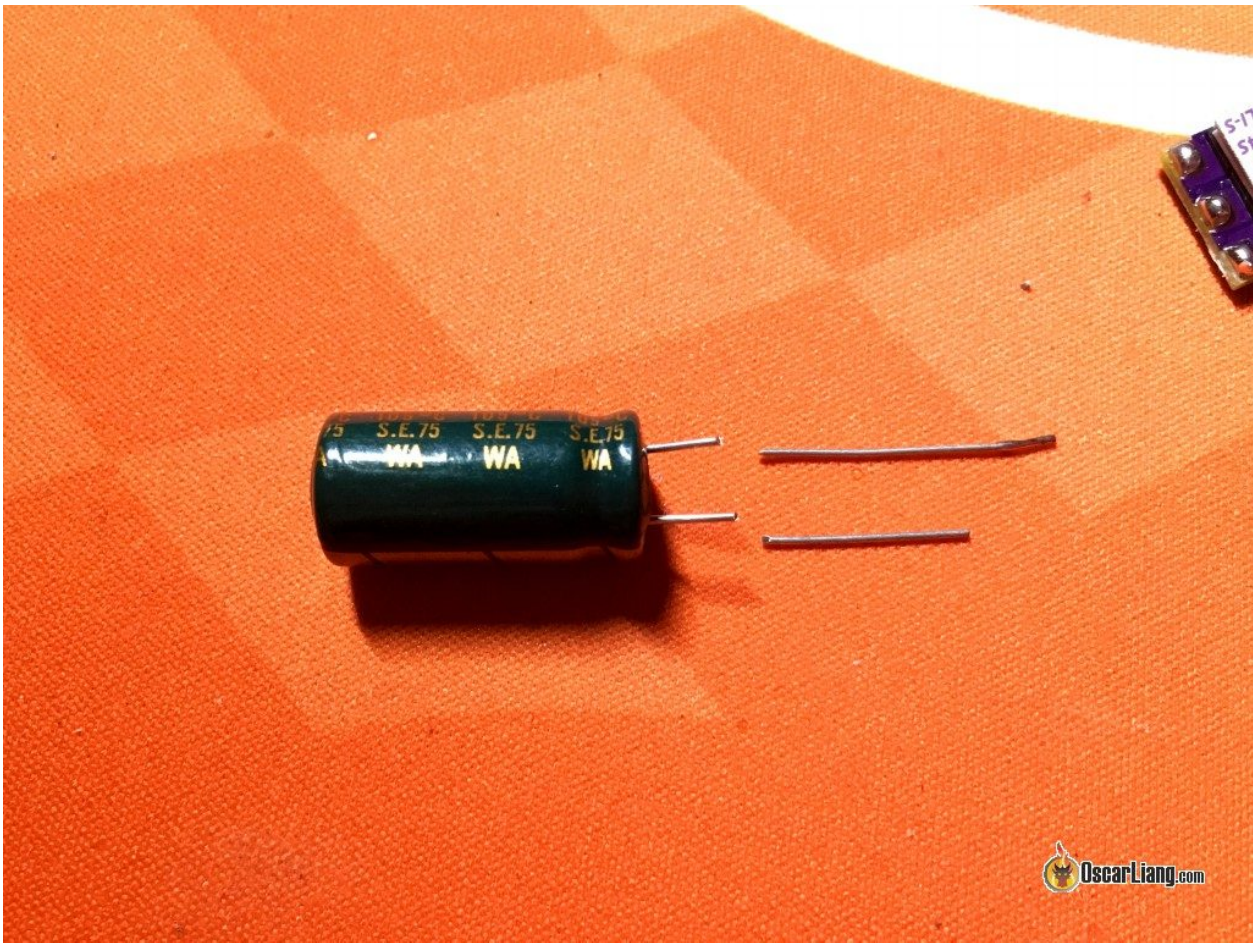
3. Or on the power terminals of each ESC (the best choice IMO).



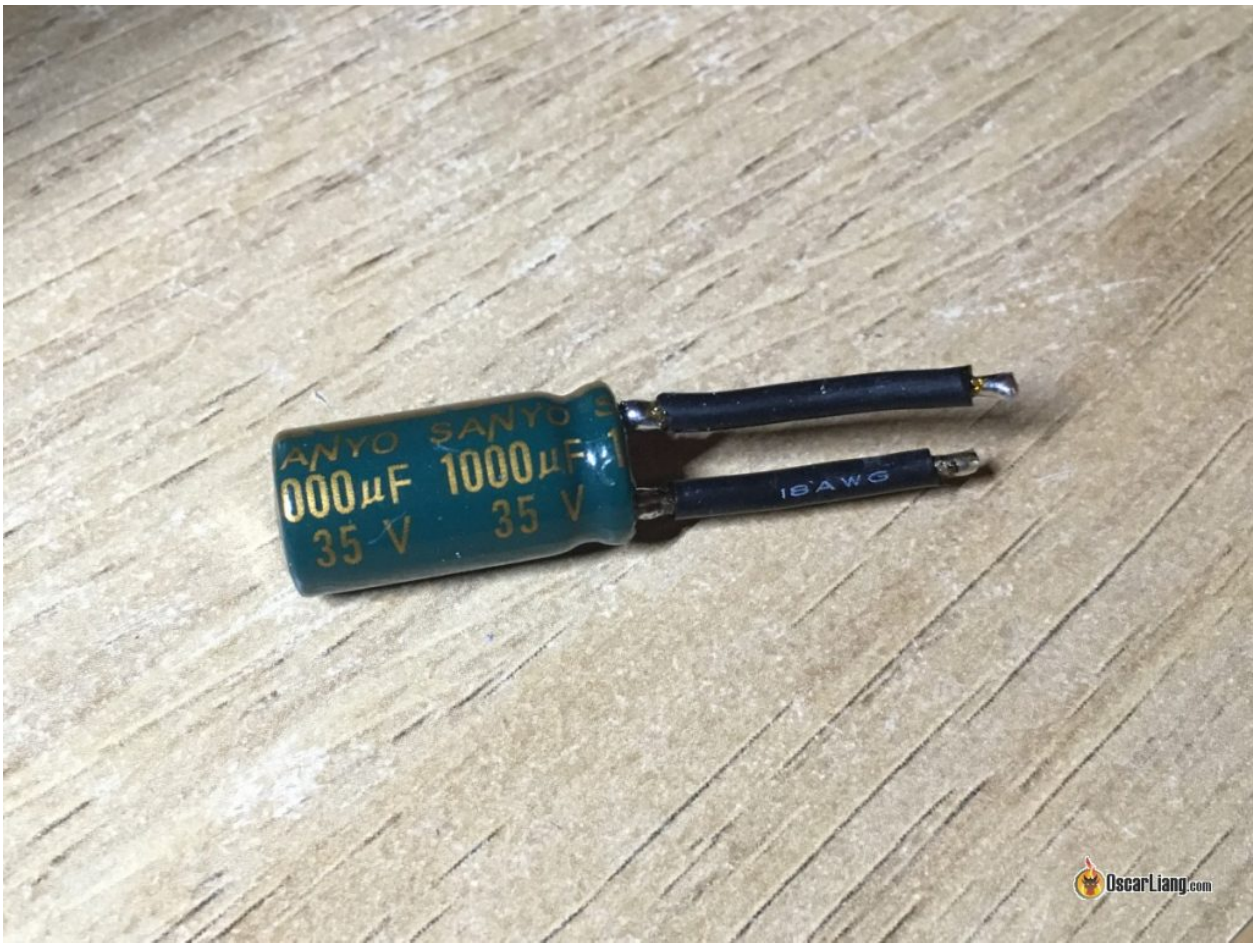
The closer your capacitors are to the source of the noise, the more effective the filtering will be. The id place to solder your capacitors is on the pads of the ESC power terminals (option 3). However you'll n solder 4 individual capacitors, one for each ESC, small ones such as 330uF should be fine.

If a cap on each ESC takes up too much space, you can solder 1 or 2 larger caps to the PDB (e.g. 1x1 or 2x470uF). It might be less effective as the caps are further away from the source of the noise, but I tried this solution on a few of my quads and it works well enough for me.

Cut the legs of your caps as short as possible for the best results, and to minimize ESR, these tiny lea conduct high current very well.



Thicker wires such as 20awg can be used for extension if there is no space for the cap at the joint, and doesn't actually seem to increase ESR by any noticeable margin.



Adding Small Capacitor to the Gyro

If your mini quad still has issues with oscillations and hot motors after adding caps to the XT60 and ES power, you might want to consider adding a small capacitor directly to the Gyro's power supply. This ca reduce the excessive amount of noise present in the Gyro's power more effectively.

This hack is for experienced users only. It's not easy finding where to solder the capacitor to, and it als requires good soldering skill.

Adding Cap to 3.3V

The Gyro (IMU sensor) on our flight controllers is powered by a 3.3V LDO regulator, so you just need t itor to the 3.3V pin of the Gyro, or the 3.3V output of the LDO. The other end of the cap solder

[Diagram of where the LDO for Gyro is]

The 3V rail should be filtered as close to gyro as possible for the best result.

Very few FC's share the same 3.3V rail with the MCU and spektrum receivers, so you might be able to the 3.3V rail on an external solder pad. IMO this is not a good design not having a dedicated low noise regulator just for the gyro sensor, but it does make it easier for you to solder the capacitor to if required

Adding Cap to 5V

The 3.3V LDO for the Gyro gets power from the 5V rail, so some people chose to filter the 5V rail and to have success cleaning up noise in the gyro. That doesn't always work but worth a try.

Popular options: 6V 220uF – 400uF tantalum capacitor: https://amzn.to/2O7mEEb

Is it necessary to add caps to the Gyro's Power?

You don't have to worry about it if you don't have issues. If you do, try other easier methods first and tr tutorial as the last resort.

Anyway, I wish all FC manufacturers in the future can provide proper filtering in the gyro power in their designs. It's good to know that many latest FC now have capacitors on the Gyro's power, including Air hopefully we won't need to DIY in the future.

Capacitor Choices

I linked to some cap options at the beginning of this article in case you don't know what to get.

It's not just capacitance value, you also have to take into account the size and weight of the cap, whetl will fit inside your quad.

25V rated caps should be enough for most 4S builds, though you may want to consider 35V just to be voltage spikes can on occasion reach higher than 25V.

If you are not sure, give 35V a try first, since they are smaller and easier to mount. If you find it getting after a flight, or exploded, then you should definitely use a 50V cap.

If the capacitor in your build keep getting hot after every flight, it could be an indication that the cap is t small.

Here's a great list of low ESR capacitors from a google spreadsheet, as well as their size and weight s can pick one that best suits your needs.

330uF – For Individual ESC

25V

Brand	Series	Size (D X L)	Impendance (Ω/100 kHz)
Panasonic	FM	10×12.5	0.038
Elna	RJF	10×12.5	0.039
Vishay	160 RLA	12.5×25	0.04
Panasonic	FM	8×15	0.041
Samwha	ML	10×12.5	0.053
Nippon	KZE	10×12.5	0.053
Panasonic	FR	8×11.5	0.056
United Chemi-Con (UCC)	KZH	8×11.5	0.062
[illegible]	KZH	8×11.5	0.062

Panasonic	FC	8×15	0.085
Panasonic	FC	10×12.5	0.09
Nichicon	PW	10×12.5	0.09
Samwha	MK	10×12.5	0.098
Panasonic	TP	10×16	0.13
Elna	RJ4	10×12.5	0.81

35V

Brand	Series	Size (D X L)	Impendance (Ω/100 kHz)
Panasonic	FM	10×16	0.026
Elna	RJF	10×16	0.028
Panasonic	FM	8×20	0.03
Samwha	MZ	10×16	0.038
Nippon	KZE	10×16	0.038
Vishay	160 RLA	12.5×25	0.04
Panasonic	FR	10×12.5	0.043

Panasonic	TP	10×20	0.052
Samwha	ML	10×12.5	0.053
Panasonic	FC	8×20	0.065
Samwha	MK	10×16	0.065
Panasonic	FC	10×16	0.068
Nichicon	PW	10×16	0.068
Elna	RJ4	10×12.5	0.7

470uF – For ESC's or PDB

25V

Brand	Series	Size (D X L)	Impendance (Ω/100 kHz)
Panasonic	FM	10×16	0.026
Elna	RJF	10×16	0.028
Vishay	160 RLA	16×25	0.029
Panasonic	FR	8×20	0.03
Samwha	MZ	10×16	0.038

Panasonic	FR	10×12.5	0.043
United Chemi-Con (UCC)	KZH	10×12.5	0.045
Nippon	KZH	10×12.5	0.045
Samwha	ML	10×12.5	0.055
Samwha	MK	10×20	0.06
Samwha	MK	10×16	0.065
Panasonic	TP	8×20	0.067
Panasonic	FC	10×16	0.068
Nichicon	PW	10×16	0.068
Panasonic	TP	10×17	0.13
Elna	RJ4	10×12.5	0.57

35V

Brand	Series	Size (D X L)	Impendance (Ω/100 kHz)
Panasonic	FM	10×20	0.019
Elna	RJF	10×20	0.02

Panasonic	FR	10×20	0.028
Panasonic	FR	10×16	0.028
Panasonic	FR	8×20	0.03
Nichicon	UHW	10×16	0.03
Nippon	KZH	10×16	0.032
United Chemi-Con (UCC)	KZH	10×16	0.032
Vishay	160 RLA	18×20	0.035
Panasonic	TP	12.5×20	0.038
Samwha	ML	8×20	0.038
Samwha	ML	10×16	0.041
Samwha	MK	10×20	0.05
Panasonic	FC	10×20	0.052
Nichicon	PW	10×20	0.052
Samwha	MK	8×20	0.088
Elna	RJ4	10×16	0.5

Brand	Series	Size (D X L)	Impendance (Ω/100 kHz)
Elna	RJF	12.5×20	0.017
Panasonic	FR	10×25	0.018
United Chemi-Con (UCC)	KZH	10×25	0.018
Nippon	KZH	10×25	0.018
Panasonic	FR	10×20	0.02
Nichicon	UHW	10×20	0.02
Nippon	KZE	12.5×20	0.021
Samwha	MZ	12.5×21	0.025
Vishay	160 RLA	16×31	0.027
Samwha	ML	10×20	0.033
Vishay	136 RVI	12.5×25	0.034
Panasonic	FC	10×30	0.035
Panasonic	FC	12.5×20	0.038
Nichicon	PW	12.5×20	0.038
onic	FC	16×15	0.043

Samwha	MK	10×20	0.05
Elna	RJ4	10×20	0.27

35V

Brand	Series	Size (D X L)	Impendance (Ω/100 kHz)
Panasonic	FM	12×25	0.015
Elna	RJF	12.5×25	0.015
Nichicon	UHW	12.5×20	0.017
United Chemi-Con (UCC)	KZH	12.5×20	0.017
Nippon	KZH	12.5×20	0.017
Panasonic	FM	12.5×20	0.018
Nippon	KZE	12.5×25	0.018
Samwha	MZ	12.5×25	0.022
Vishay	160 RLA	18×35	0.024
Samwha	ML	12.5×20	0.026
Panasonic	FC	16×20	0.029

Nichicon	PW	12.5×25	0.03
Samwha	MK	12.5×20	0.043
Elna	RJ4	12.5×20	0.23

- Panasonic EB, EE, HD, NHG,GA, M, SU, KA and KS series are not low ESR
- Samwha SD, BH and RD series are not low ESR, WL and WF are mediocre
- United Chemi-Con (UCC) with KZM series is comparable to KZH
- There are much more low ESR Vishay capacitors, but they are just too big
- Rubycon low ESR capacitors go only up to 220uF – thus not show here
- Elna RJ3 and RJ4 are comparable

Edit History

- May 2017 – Article created
- Oct 2017 – Updated cap options, uploaded a video to show the effectively of adding cap
- Apr 2018 – Added section “Does my Quad Need Capacitor?”
- Aug 2018 – Added section “Adding Cap to Gyro’s Power”
- May 2019 – Updated capacitor introduction
- Jan 2020 – Added info on cap getting hot, cap size consideration

INTERMEDIATE

previous post r

HeliSuite Doesn’t Response / Won’t Run **Tutorial: Soldering Li-Ion Battery Cells**

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website. Note that all comments are held for moderation before appearing.

SUBMIT

88 COMMENTS

MERIN KUMAR

24th February 2022 - 6:07 am

Hi Oscar, I built my 1st 6S setup (mainly iflight electronics), doc mentioned 50V cap for 6S 35V for 4/5S, but the cap i got in the ESC stack from iflight is 35V (Succex-D mini twing F7 esc). So i checked and only can find Unicon UPL 220uF 50V caps, cant find hight capacita would that work 220uF ?

RODRO

25th October 2021 - 12:54 am

Hey Oscar, thank you for sharing your knowledge. You already helped me out a bunch of ti So I have this 6S quad where there is no space at all for the capacitor to be correctly moun soldered to the battery pads on my 4in1 ESC. So I have it soldered on the XT-60 battery-si the end of the pigtail.

compensate for that?

Thank you!

P.S. Does the size of the motors matter? I have 2814 Xing 1100KV

VITORIO

7th September 2021 - 5:35 pm

My 35v/ 530uf cap burned out on first test of the motor. I'm running a matek f722se, kramar esc, and five33 2207, 1970 kv.

All smoke test where fine. No damage to anything but the cap. Should I just get a bigger ca that an indication for other issues?

OSCAR

7th September 2021 - 11:31 pm

I assume that's a 6S build? But even for 6S it's very unusual to burn out cap for 35

Maybe you have a very noisy build, try to get the 50V rated cap i linked?

The other thing is to make sure polarity is correct and the cap is in good shape (br new, no dents etc).

MAREK

15th April 2021 - 5:49 pm

Hello,

I would like to say few words about capacitors for noise filtering. I am going to add 100nF c capacitor in parallel.

A large capacitor like 1000 uF act as a "reservoir" to store energy from the Li-Po out .

When large current peaks are drawn the capacitor supplied surge energy helps the battery in output.

High value polarised capacitors typically do not have ideal characteristics at high frequenci
, so it's fairly common to add a low value capacitor in parallel
in situations where you need to worry about stability at high frequencies.

GUSTAVO

19th January 2021 - 10:53 pm

It would be interesting to see how to calculate the Farad rating for a build.
Your site is always the first stop when I want to learn something related to quads. It's often source with high quality and comprehensive information.
I've read all the comments here and looked online a bit to try to understand how to calculat needed. I get that the more the better, but I'm trying to build ultra-light toothpicks so weight size are a concern. Also for curiosity, as I love to learn this kind of stuff.

MARIEL VASCONCELOS

10th July 2020 - 1:50 am

Hey Oscar, just like one of the 100 people that commented on this article, Im extremely tha
You deliver clear concise information.
I added a 1000uf 35 cap to my Bat connection on my 5 in. I get no horizontal lines on start still have faint lines after arming.
Do you think it would be a good Idea to put the cap on my 4n1 ESC power pads instead? I heard that maybe putting the ground on the VTX onto same ground as camera could work
Either way, love your website, thank you again

OSCAR

12th July 2020 - 11:11 pm

As close to the ESC power as possible is always better.

29th April 2020 - 4:50 am

Hi Oscar,

Hope you see this comment since your post is 2 years old. I've run into a weird issue that I' hoping is capacitor related. I have a newly built 6S rig that exhibits weird glitches at punch swapped every component but the frame. I've tuned the quad it it flies perfectly, except whe punch out the throttle and even then, it seems like the glitches only occur when the battery Once it's lost some charge from flying, it no longer has problems punching out. Sound like noice messing with the ESC and motors?

MARTIN

2nd April 2020 - 10:30 pm

Hello Oscar

This is a very good article, thanks for going to the time to write it up. Just a simple question know what make/model the esc shown in you article is? i have been asked to help a friend quad but the ESC need to be programmed.

Any information would be appreciated. Thanks

MILES MCNEILL

2nd April 2020 - 8:49 pm

I have an older quad. Rated for 2s. I put a 3s for fun.

Blew 1 capacitor on landing.

Do these older quads with capacitor s need capacitor s?

It had 2 capacitor s next to the battery plug to begin with

GENNARO

18th March 2020 - 10:19 am

I'd like to build a 3S toothpick and install a 270µF 16V solid capacitor (ESR 5mΩ) in the X connector.
Which capacitor would you suggest to use in my case?

OSCAR

30th April 2020 - 4:37 pm

The 220uF or 330uF I linked should be fine.

VOUSIE

20th January 2022 - 2:57 am

That's not actually an answer. Not everyone can/wants to buy from your U Amazon affiliate links. Makes you look like a shill when you just keep adve your own stuff.
So, as I'd like to know the answer too, I ask again: Is an ESR of 5mΩ low for a small quad?

OSCAR

20th January 2022 - 5:32 pm

It's like asking "how short is a short string".
Having any capacitor will help, but lower ESR is always better. So lowest one you can find.
The Amazon link I provided is linked to "Panasonic FM" Capacito is known to work well.
So yea, I hope this shill answered your question.

information that you really like to have.
The best blog for FPV.

HARRY MURPHY

22nd July 2019 - 3:16 pm

I have read the article and reviewed the spreadsheet, but could not determine what capacit need. I have several quads that use “Whoop Lite” flight controllers with Silverware and 852 brushed motors. These are 1S (3.7-3.8v) setups. There is so much noise that the video is r useless. I would like to try adding a capacitor where the power leads attach to the FC, but c determine what to buy. Will a 25v work? what uF?

NETMONK

9th July 2019 - 11:00 pm

Well it this whole article and all comments, it is never said how to solder with polarity to res So is it ok to solder +leg of the capacitor to the + pole of the esc 4in1 and the negative leg capacitor to the negative pad of the esc 4in1 ???
Why so basic things are not even said in this page ?

OSCAR

15th July 2019 - 5:15 pm

Yea, your assumption is correct.
basic things are not said because it only takes 10 seconds to google “how to conn capacitor”.

SLAVA CHROME

OSCAR

23rd May 2019 - 6:39 pm

yea it's fine. but thicker is always better.

LARRY BRYANS

13th May 2019 - 7:32 pm

Hi Oscar. Love all the info you share with us. As a newbie I hope you can help. I have a R2 Diatone and the little capacitor at the rear of the stack fell off. I've only had a few flights, bu canopy front came loose and that was an easy fix, but the capacitor has been recovered ar extremely short leads. Do you know where I could get one the same size? Banggoods was help! It's only a couple of months old.

OSCAR

14th May 2019 - 11:16 am

Here: https://amzn.to/2Yt2724

JUSTIN

25th April 2019 - 4:08 am

Can i put an capacitor on each esc on an Aikon AK32 V2 32Bit 35A all in one esc?

SLAVA CHROME

7th April 2019 - 8:37 pm

If I don't have so much space for installing Panasonic FM 1000mf 35v right on solder pads, added 6cm 18awg wires and moved capacitor back the fpv camera (between camera and I really bad???

it's okay to use wires, obviously, you should keep it as short as you can.

KAMIL

2nd December 2018 - 1:00 am

I would add Jamicon TL low esr series capacitors, 1000uF has 0.038 impedance. They are and available where i live. They are pretty good, i'm using one 1000uF on battery pads, an much better video on no camera restarts anymore after snappy movements of motors :) so doing it's job very well

MANJULAL

28th October 2018 - 1:56 pm

Hey Oscar,
I was planning to add 470uF 35V capacitors to my ESC power points, but only 470uF 25V available here. I am using a 4S batt pack. Should I be concerned?

MIKE WILLIAMS

17th October 2018 - 2:55 am

I HAVE NOISE IN MOTOR #4 AND ITS IN MY FPV …I BOUGHT A IC FILTER BUT DONT WHERE TO CONNECT IT IN THE RACE QWAD??? IN YELLOW ON CAM AND GROUNI OR – AND+??? HELP PLAESE THANKS MIKE

ALL DAY AIR

13th September 2018 - 6:18 pm

Has anyone tried the Matrix PDB with 4800uf super low esr caps on board? I am going to b installing it soon and just wondered if anyone else had experience with it. Thanks!

Hi Oscar. Thank you for all the valuable information. Aishi capacitors seem to be quite com central Europe. Here is a spec sheet. Is Impendance (Ω/100 kHz) on your spreadsheet the as dissipation factor or tano? capcomp.de/fileadmin/Webdata/partner/AISHI/catalog_serieg /ASH_2014_WH_Series.pdf

STEPHEN SHOEMAKER

9th April 2018 - 9:01 am

hi, just wondering……..
I soldered in a cap backwards (polarity). On a new build, on the initial smoke test, it started a hissing noise and I could see it was getting hot. I immediately disconnected the power an discovered that I had soldered the cap in wrong. I'm guessing the cap is done but am need know if there could be further damage to additional electronics. The cap was soldered to a f428 all in one board where it was designated to be. I replaced the cap with a new one, plu again and now have motor#1 get hot very quickly. Any idea whether this could be related?? new to building and not sure where to go from here……any help would be greatly apprecia Sttephen

DAFUNK

24th May 2018 - 12:24 pm

I mounted mine and shorted it. It went in flame and it projected a lot of black smok shape of a cone, relatively easy to clean.
I have been flying it for 3 months now, all electronics are fine
I guess you can be lucky and get away with it… just be safe on your first 2 or 3 pa

TIM

1st June 2018 - 11:40 am

13th June 2018 - 7:11 am

Hi Stephen,

soldering a cap the wrong way only damages the cap. If you hear hissing, you cap already done for. If it bulges out and smokes, it's already past that stage. If it explo a thousand pieces, well, you get the point.

Now, the cool thing is, the damage will be limited to your capacitor. By reverse con the capacitor, you actually shorted it out. So there was a high current going from th battery through the capacitor back to your battery, heating up the cap and damagir In extreme cases, you may damage the battery because it discharges at a high C and if it stays shorted for multiple minutes the battery may discharge down to a vol that it's bricked. But since you disconnected it quickly, that kind of damage is very

A motor getting hot is typically related to a worn out motor. I assume yours are bra since you're starting in the hobby. You can test using a process of elimination. Swa #1 and motor #3 (assuming a quad copter) and see if #1 or #3 gets hot. If now #3 and #1 doesn't, it's probably your ESC. If #1 gets hot again, there's something wro the motor. Electrically, there is not much that can go wrong with a motor. I would ex worn out bearings, a manufacturer error or if it's electrical in nature, a screw that h protruded part of the windings during assembly. In any case, I expect the cause of motor#1 to be not related to the cap.

Bottom line, your other electronics (flight controller, etc…) will be fine. :-)

MORITZ BEYER

9th April 2018 - 7:09 am

Jesus! Lots of comments!

Well, I hope mine will be new.

So how does the size of the capacitor matter?

You recommend 1000 uF at the Power plug. The Bolt32 comes with 2000 uF.

TEST

15th April 2018 - 12:41 pm

The value means “capacity”

The higher the better for filtering

OSCAR

17th April 2018 - 6:44 pm

The bigger the better if size isn’t an issue for you. I find 1000uF generally can fix m
my issues that’s why I recommend it.

BILL

9th March 2019 - 11:26 pm

Have you tried any other cap types, ceramic,mylar,poly, tant.,etc? I might
the scope and see what ripple I can find.

PIERRE

28th February 2018 - 1:05 pm

Hello Oscar.

Great article here..

But i have a question:

On a 6S build what caps do u recomend??

And what Voltahe should they be??

Cheers

OSCAR

6th March 2018 - 6:00 pm

SIMON IRELAND

13th February 2018 - 7:45 am

“Cut the legs of your caps as short as possible for the best results, and to minimize ESR, th tiny leads don’t conduct high current very well.”
Oscar with all due respect, the filtration Capacitor is not intended to handle high current, nc it need to. It’s intended to filter out “ripple” voltage spikes within the low frequency spectrum Adding a few inches of wire will have absolutely negligible impact for the intended purpose is particularly beneficial for quads where you need to position the Capacitor away from the battery. It is erroneous to suggest the Capacitor leads must be short.

STEPHEN GIBB

4th March 2018 - 1:02 am

No its not he is actually referring to the capacitors legs which are in fact quite poor conductors especially at high frequencies.
The purpose of these caps is to smooth voltage transient spikes not ripple this isn’ bridge rectifier. The active braking dumps a lot of charge quickly into the system re in high voltages if there isn’t enough capacitance to soak it up.
The instantaneous current can be very high.

BILL

9th March 2019 - 11:30 pm

short leads always, they also radiate less rfi/emi

RODDY

17th January 2018 - 7:44 am

How about installing the capacitor on XT60 when PDB is equipped with current sensor?

MACZAR

15th May 2018 - 10:02 am

I think you cannot install capaitor on battery lead when using AIO FC or FC with PI integrated that is equipped with current sensor.
In my quad there was no filtering with this kind of connection, same as without any When I have soldered caps to ESC power leads ad FC, capacitor are now doing th – quad is now perfectly tuneable and fly great.

JAKE

7th January 2018 - 12:46 am

So far lots of useful info here!
In case anybody doesn't already know and is paying hiked up prices for passive componer capacitors on sites like Amazon or Ebay, check Mouser – very fast shipping, industry pricin lot of useful stuff. They don't mess around and you can trust their technical information and Just as an example – Amazon pricing on qty of 6 Panasonic FM 330uF 50V caps, $11.68. I has them listed at $0.75 ea., or $4.50/6 (with 100% technical data so you know all the little and can easily compare!). Of course you have to weigh shipping costs (around $8 where I'r Amazon and others typically have free shipping), but if you deal with a lot of quads then yo best served in the long run picking up higher quantities and other useful parts/supplies in o order. You can save a lot of money, and put it back into your quad. ;D
Curious about one thing here, aside from plugging an electrical parts supplier: Is it a good i do an ESC calibration after adding capacitors? I've fixed a few issues with unexpected flipp calibrating, so I've been starting to recalibrate ESCs almost every time the quad goes on th bench. I figure it's easy enough, but wondering if it's necessary after this little mod?

WALKEER

22nd November 2017 - 3:26 pm

SEB

3rd December 2017 - 9:46 am

Price!

SIMON IRELAND

13th February 2018 - 7:54 am

ESR capacitors are not critical, they are desirable. You can use regular electrolytic capacitors and still get effective filtration. The low ESR capacitors are better but yo quantify the difference between the two off this video. It's just a simple demonstrati a definitive comparison.

STEPHEN GIBB

4th March 2018 - 1:03 am

Low ESR whilst still having a sufficient capacitance to do the job poly caps tend to low capacitance for there size and weight.

SKYWALKER

20th November 2017 - 10:22 pm

Hi .dear oscar
I buy rubycon 470 uf 25v zlh series cap . Can i use this cap for my esc s to decrease noise google spreadsheet that you say this cap was located. Can i use ?
Thank you -skywalker

GOGI

10th November 2017 - 8:38 am

jazz to no success.

So my question is would a capacitor fox this?

ThanX in advance :D

RODERICK HEAL

29th October 2017 - 6:17 am

Haven’t tried this before on any of my quads but want to try it.

Which way round should the caps be connected?

JESSE

26th October 2017 - 6:26 am

Can you put 1000uh Capacitors on your ESC if that’s all you have? Or will it cause a proble

OSCAR

30th October 2017 - 5:33 pm

Yea that should be fine if space isn’t an issue for you.

JORGE

11th October 2017 - 6:56 pm

Hi, I bought a second hand quad with the same red ESC in a picture of the article, and it br
dawn yesterday, I hope yo can tell me which model is, so if yo please can answer this comı
earlier as you see it, I will appreciate.

PD: Very interesting article.

OSCAR

JORGE

19th October 2017 - 9:04 pm

OK, thankyou, I finally found a similar ESC from Eachine of 12A, I wanted
because, yea is old, but is the best drone to learn racing with Acro mode a
nothing happened if it broke
down.

FRED

9th October 2017 - 10:03 pm

Hello Oscar
From my experience with tekin esc on rc car, they are using either the rr or rnu series of nic
capacitor
Would they be better than your recommended list ?
330 uf 25v digikey.ca/product-detail/en/nichicon/RNU1E331MDN1PH/493-6635-1-ND/3466

JUSTYN MARKLAND

12th September 2017 - 3:23 pm

I am using Panasonic fm 270uf 50v caps on my esc's. I also use the 2 of the same caps on
pdb. This is for a 6s setup. Multiple small caps are better then one large capacitor. The 50v
gives plenty of head room. 35v would do, but the 50v caps have a lower esr and higher ripp
current.

JOE D

6th September 2017 - 12:50 am

Anyone use 470uf Panasonic cevss series?

what about a pdb and fc in one like the DYS f4 pro

OSCAR

21st August 2017 - 3:01 pm

what about it?

KAI

18th August 2017 - 10:10 am

Is this list of low ESR capacitors comprehensive?
I found some ‘Sanyo High Frequency Low ESR Radial Electrolytic Capacitors’ for 35V & 50
at 470uF & 1000uF (105-deg C) going pretty cheap on eBay. But they’re not on your list.
Can I use them?

OSCAR

21st August 2017 - 2:53 pm

It’s likely that it’s missing a few. You can certainly try them although I don’t really tr
sellers on ebay for quality products.

BEN T

16th July 2017 - 1:46 am

Hi Oscar,
Thanks for doing all these videos and sharing the knowledge.
I put 4 330f Panasonic FM capacitors on my 5″ quad. Emax 2205S, 2300 kv with Aikon 20A
When I plug in, motor 4 will start to spin on its own, even with the quad unarmed. Do I need
set the end points or do some sort of recalibration somewhere?

1st August 2017 - 11:35 pm

Anyone?

BUZZ

3rd August 2017 - 4:19 pm

Usually, a motor that spins up on its own means that you have a malfuncti
MOSFET on that motor's ESC.

MATT E

27th September 2017 - 7:49 am

lower your endpoints manually by 10 or 15. should solve the issue. Mine h
done this before but its usually seen as motor twitches. if you still have iss
make sure you calibrate your ESCs. Google should show many results on
subject.

CYRIL MARTINEZ

19th June 2017 - 1:06 pm

Very nice article and explaination.
As i am willing to build micro quad, i was wondering if the use of capacitors is necessary, d
increasing weight, and the lack of space inside those frame ?
What about using capacitors when using 2 in 1 or 4 in 1 ESC's ?

OSCAR

25th June 2017 - 4:19 pm

for a micro quad? I don't think it's necessary. But it wouldn't hurt to add one in if th

7th June 2017 - 3:35 am

Will adding the 4 smaller caps to esc's also clean up the power going to the 5v and 12v bec should I use one 1000 micro farad cap on the battery lead? Also will the 4 smaller 25v caps their voltage incase the spike is greater than 25v? (E.g. for a combined 100v protection wit caps)

OSCAR

12th June 2017 - 4:24 pm

Yes. Either way would help. No the voltage rating is for each Cap, they don't add u

NICKB

29th May 2017 - 6:00 am

Hello Oscar. What about dshot and adding extra capasitors? Are they also needed? I assu you also have spikes, but people are removing caps from their escs? Or this is irrelevant.

OSCAR

30th May 2017 - 11:49 am

People are removing caps to run DShot because it was connected to the signal. The Caps we are adding here are connected to the power, so different caps.

SCOTT CLINE

28th May 2017 - 1:40 pm

Thanks for this article Oscar. It helps explain a lot of things about adding a capacitor to you that I would have spent days/weeks/months trying to figure out.

will these work on my Quads

LUSETTI

23rd May 2017 - 7:36 pm

In example 1 where you have the cap on the XT60 can the cap go on the batteries connect

OSCAR

28th May 2017 - 4:35 pm

yes but it's better to place the caps closer to the ESC as possible

RUBEN

22nd May 2017 - 6:47 pm

I read a lot if the size of the caps. Some say 1 470 uf on pdb is enough, other say 1000uf is needed. Does it matter how much caps on the esc itself is placed? Like a total uf on the wh quad?

OSCAR

28th May 2017 - 4:25 pm

there is no rules on total uf required, it depends on how noisy your quad is.
But generally speaking 330uF on each ESC, or 1000uF on PDB works for most pe
470uf on ESC would even be better, but a little bigger.

BEN

22nd May 2017 - 1:48 am

Goo it would be nice if there were non cylinder shaped Capacitors. Maybe rectangular/cub

JUSTYN MARKLAND

12th September 2017 - 3:28 pm

You could make a small pcb board with ceramic capacitors, but you would need a of them. The uF rating is lower on the ceramic caps.

ERWIN

21st May 2017 - 9:56 am

Hi oscar, Is it okay to install capacitor on each esc even if theres already a lc filter

OSCAR

28th May 2017 - 4:20 pm

LC filter reduce noise getting into your FPV setup… capacitors “clean” noise in you power, so yes, it’s okay.

1337FLITE

20th May 2017 - 6:48 pm

No “might” about caps saving your electronics.
I lost at least 2 x FCs, 1 VTX and an RX for no apparent reason before I found out about sp ESC braking and capacitors.
I now run a single 220uF 25v cap on each ESC and my video is better, but more importantl not lost a single component since (except the Tramp I bent in half in a crash – not spike rel

DEAN BUCKNER

20th May 2017 - 4:34 pm

What size caps would you recomend when using 2 6s lipos to feed a heavy life six rotor? N

FACEBOOK TWITTER INSTAGRAM

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